

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re Patent Application Of:

Honorio S. LUCIANO

APPLICATION NO.: 09/361,849

CONFIRMATION NO.: 6048

FILED: July 27, 1999

FOR: Surface Mount Electrical Device
with Multiple PTC Elements

Examiner: Karl D. Easthom

Group Art Unit: 2832

MAIL STOP RCE

Commissioner for Patents

P.O. Box 1450

Alexandria, VA 22313-1450

DECLARATION OF HONORIO S. LUCIANO PURSUANT TO 37 C.F.R. § 1.131

I, Honorio S. Luciano, the Applicant in the above-identified U.S. Patent Application, hereby declares as follows:

1. I am the named inventor in the above-captioned application.
2. Sometime prior to July 9, 1998, while employed by Littelfuse, Inc., I conceived the original idea of a surface-mountable electrical circuit protection device comprising:
 - (i) a first polymeric PTC element having first and second surfaces, a first electrode attached to the first surface;
 - (ii) a second polymeric PTC element having first and second surfaces, a second electrode attached to the second surface;
 - (iii) a third electrode positioned between the first and second polymeric PTC elements, the third electrode connected to the second surface of the first polymeric PTC element and the first surface of the second polymeric PTC element;

(iv) the first polymeric PTC element being in direct contact with the second polymeric PTC element;

(v) a first electrically conductive end termination wrapping around a first end of the device and electrically contacting the first and second electrodes;

(vi) a second electrically conductive end termination wrapping around a second end of the device and electrically contacting the third electrode; and

(vii) wherein an electrically insulating layer is deposited on the first and second electrodes between the first and second end termination.

3. I have reviewed pending claims 1-5, 7-9, 11, 23 and 24 of application Serial No. 09/361849. The original idea which I conceived prior to July 9, 1998 includes the subject matter of at least currently pending claims 1-5, 7-9, 11, 23 and 24.

4. Attached hereto as **Exhibit A** is documentation dated prior to July 9, 1998 which shows the ideas referenced in Paragraph 2 above. The Applicant respectfully notes that these documents are not presently being relied upon for establishing the earliest date of conception and/or reduction to practice of the invention, but are being used to establish that the Applicant's date of conception and/or reduction to practice was prior to July 9, 1998.

5. From a time prior to July 9, 1998, and continuing until after July 28, 1998, I diligently and continuously reduced the invention to practice by:

(a) preparing the drawings, notes and description in **Exhibit A** prior to July 9, 1998;

(b) actually reducing the idea to practice prior to July 9, 1998;

(c) filling out and submitting an invention disclosure form to the appropriate Littelfuse corporate personnel;

(d) meeting with Littelfuse's patent counsel to review and discuss my disclosure;

(e) reviewing at least one draft of a patent application covering the claimed invention; and

(f) filing the parent U.S. provisional application (Serial No. 60/094,434) on July 28, 1998.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. § 1001 and that such willful false statements may jeopardize the validity of the Application or any patent issued thereon.

Date: _____

By: _____
Honorio S. Luciano

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INVENTION DISCLOSURE FORM

REDACTED

The purpose of this form is to obtain the information needed to evaluate the patentability of your invention, and to enable a patent search and a patent application to be considered or pursued. If a patent application is filed, this information is also needed to satisfy your duty of disclosure to the United States Patent and Trademark Office. If you need more space for an answer, you may attach other sheets.

Title of Invention: Multi Layer PTC Element

Name of Inventor (s) Nori Luciano

A. Feature of Invention: Describe your invention giving all novel features and advantage of each. If necessary, attach a drawing (s) and reference the novel features.

Multi Layer PTC element devices will give high current ratings for the same foot print.
See attached steps for the process of making a multi layer device. This process allows for
surface mount devices to be made with current flow through most of the length of the PTC
elements which will give better performance

B. Dates:

First Conception

REDACTED

(Attach dated sketch or memo.)

First Reduced to Practice

First LF Disclosure

REDACTED

to whom

William Travis

First Disclosure Outside LF, Date

Whom

Need for Outside Disclosure:

REDACTED

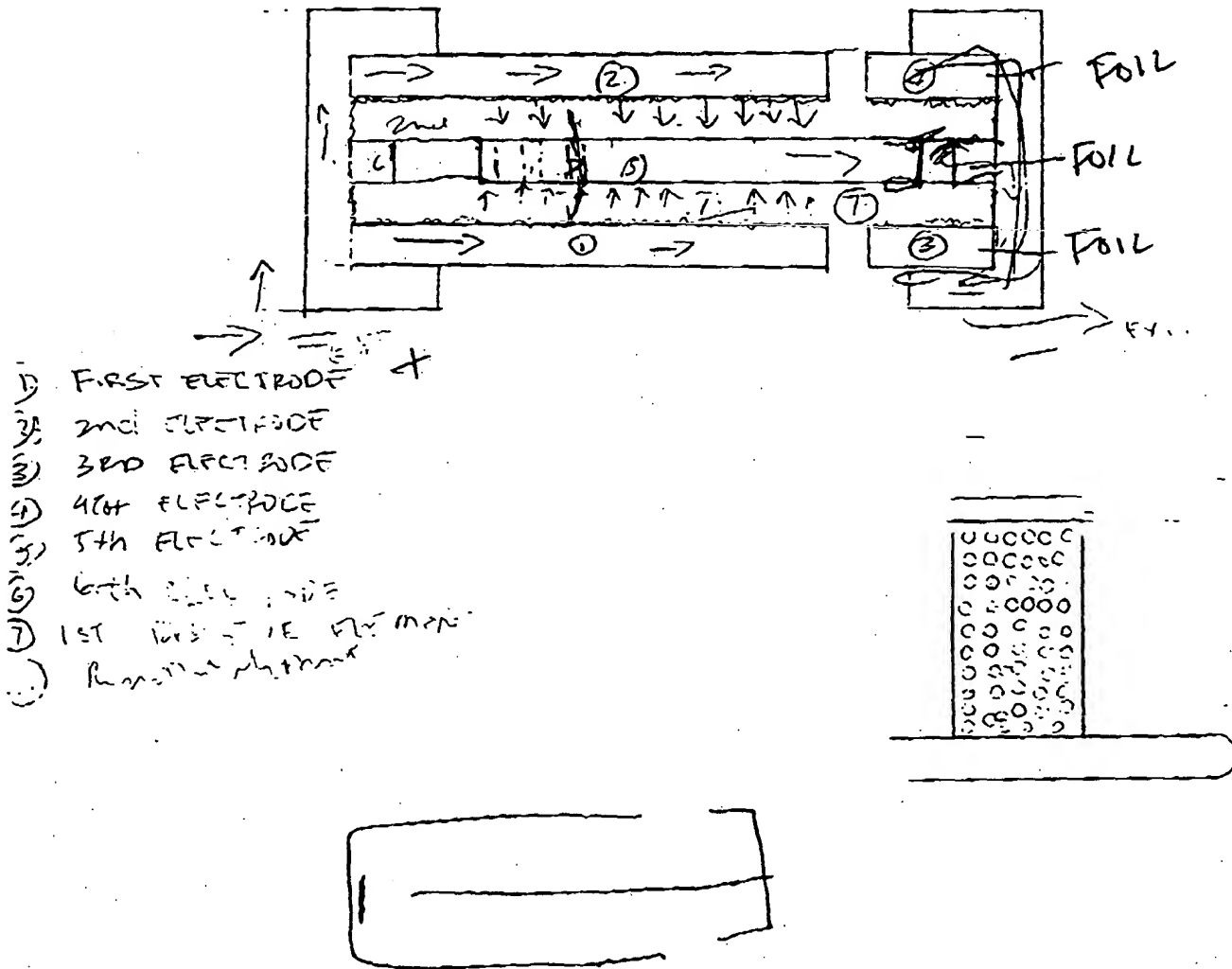
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Project No. _____

Book No. _____

TITLE _____

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Date

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Invented by

MR. LULIAN J

Recorded by

REDACTED

Date

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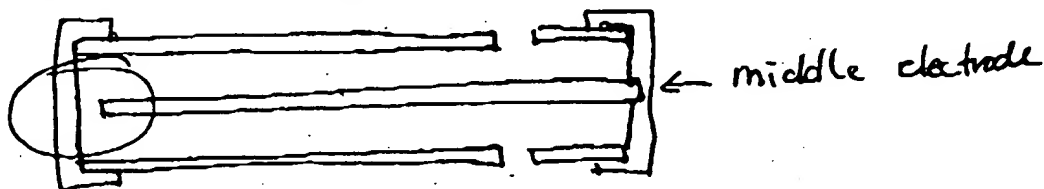
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TITLE MULTILAYER PTC

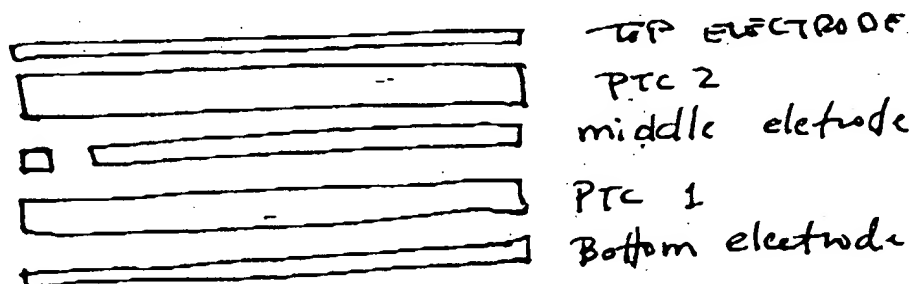
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STEP 1. ETCH THE MIDDLE ELECTRODE (OR THE FOIL)

As seen from the drawing below, this will separate the middle from the top and bottom electrode -



STEP 2. Laminates all the metal electrode to the Polymer by following the illustration below.



STEP 3. Create an opening on both ends to allow the plating to wrap around the edges.

(and at the same time connecting the

STEP 4. ELECTROLESS Plate the Surfaces and Edges for

Continue to create a conductive surface

STEP 5. Full panel - ELECTROLYTIC PLATE .001 mil Copper

over the entire device -

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P multi layer PCB.

6.] Apply photo imaging film and expose the gate on the top and bottom exposure electrode

7.] etch the (gate) metal from the to gate areas.

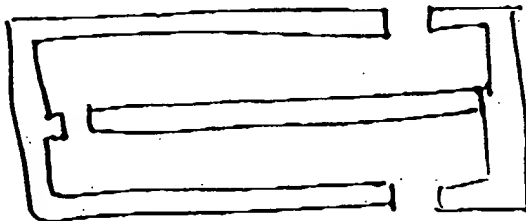
8.] apply dielectric material to separate the pocket under the electrode and the polymer from the mixture - and deposition of the termination -

9.] Image and develop the termination areas

10.] E. ELECTROLYSE Plate one the termination - copper and tin lead -

11.] Separate the Parts By Shaving, Dicing

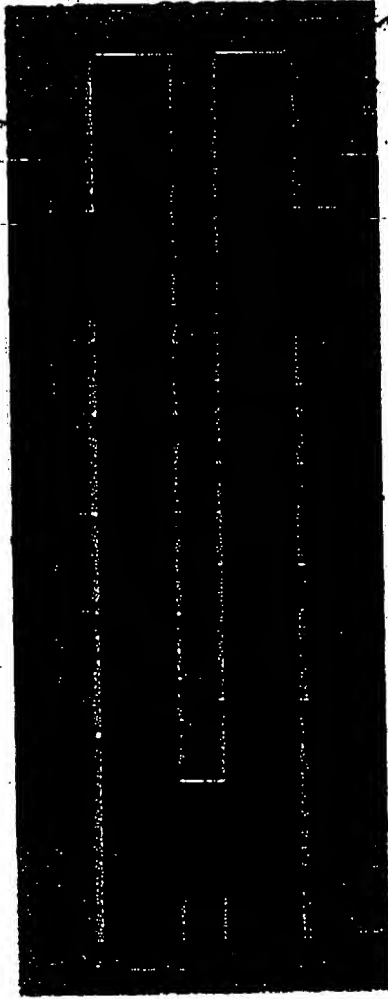
12.) Final Device



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PTC MATERIAL

REDACTED



ELECTRODES
CU & NICKEL

REDACTED

TERMINAL
CU
TIN/LEAD

REDACTED

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